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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,125	11/25/2003	Chihiro Fujita	245734US6	4381

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EXAMINER	
MALEK, LEILA	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
11/15/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/720,125	FUJITA ET AL.	
	Examiner	Art Unit	
	Leila Malek	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12-17,19-26 and 28-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12-17,19-26 and 28-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to the amendments received on 08/21/2007.

Claim Objections

2. Claim 1 is objected to because of the following informalities: as to claim 1, line 3, "last" needs to be replaced by least. Appropriate correction is required.

3. Claims 24 and 25 are objected to because of the following informalities: as to claims 24 and 25, "said transmitting signal" has antecedent basis problem. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-9, 13-16, 20-23, and 29-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims, 6, 7, 9, 13, 14, 16, 20, 21, 23, 29, 30, and 32 limitation, "considerable interference signals", is vague and indefinite.

As to claim 7, limitation, "undesired interference signals", is vague and indefinite.

As to claims 8, 15, 22, and 31, limitation, "relatively high level", is vague and indefinite. Because "relatively" renders the claim indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayasu (US 2002/0136334), Walton et al. (hereafter, referred as Walton) (US 2003/0035491), Subramanian et al. (hereafter, referred as Subramanian) (US 2001/0031014), and Norman (US 6,023,492), further in view of El-Gamal et al. (hereafter, referred as El. Gamal) (US 2001/0034868).

As to claim 1, Nagayasu discloses a radio communication receiver (see Fig. 1), for reproducing a transmitted signal by a process of de-interleaving the transmitted signal (see Fig. 5, block 52), sequentially decoding the de-interleaved signal (see block 53), and re-encoding the decoded signal (see block 54) to successively cancel the re-encoded signal from the transmitting signal (see subtractor 51). Nagayasu discloses all the subject matters claimed in claim 1, except that the receiver reconstructs the transmitted segmental frames, sequentially decodes codes of the signal in descending order of Signal-to-Interference and Noise power Ratio, and de-interleaves the transmitted signal from the at least two sending stations in accordance to each different interleave method. Nagayasu is also silent in disclosing a transmitter station as claimed in claim 1. Walton, in the same field of endeavor, discloses a wireless communication system (see paragraph 0002). Walton further discloses that at the receiver the signal-to-

noise-plus-interference-ratio (SINR) (see paragraph 0026) values of the incoming signals have been calculated and the SINRs are ranked in order from highest to lowest SINR, and the signal having the highest SINR is selected and further processed to obtain a decoded data stream (see paragraphs 0060 and 0067). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Nagayasu as suggested by Walton to reduce the amount of error in recovery of the transmitted signal (see paragraph 0073). As to the limitations cited in claim 1, regarding to the transmitter, Walton discloses that the transmitter is comprising an encoders 212 and interleavers 214 to encode and interleave the incoming data streams and as the result increase the reliability of data transmission (see Fig. 2 and paragraph 0026). Walton further discloses that the transmitter includes at least two sending stations (see Fig. 2, antennas 124a-124t) employing a different interleave method (see paragraphs 0039 and 0041, adjusting the interleavers based on CSI as disclosed by Walton has been interpreted as employing different interleave method) configured to transmit a transmission signal. Walton also discloses that at the receiver de-interleaver 714, de-interleaves the demodulated data in a complementary manner to that performed by the channel interleaver 214 (see paragraph 0121). Walton does not disclose power amplifying each encoded signal with a different amplitude and interleaving all signals with each amplified signal collected into one. Subramanian, in the same field of endeavor, discloses a communication system comprising a transmitter 12 having a constellation encoder 22 and a plurality of scalers 24 (See Fig. 1). Subramanian further discloses that the constellation encoder 22 is connected to the plurality of scalers 24, each of whose

magnitude scales the corresponding carrier by the fraction of the power allocated to it (see paragraphs 0004, 0016, 0019, and 0030) (i.e. interpreted as power amplifying each encoded signal with a different amplitude). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Nagayasu and Walton, as suggested by Subramanian, to mitigate the increase in the peak-to-average power ratio of the signal in the communication system (See paragraph 0015). Nagayasu, Walton, and Subramanian, disclose all the limitations claimed in claim 1, except that the transmitting station side transmits a transmitting signal obtained by a process of segmenting transmission information into a plurality of frames and interleaves all signals with each amplified signal collected into one. Norman, in the same field of endeavor, discloses a radio communication system comprising a first encoder 404, and a second encoder 406, which generate first and second encoded sequences 408 and 410 using different generator polynomials. Norman further discloses that the encoded sequences 408 and 410 are interleaved, by an interleaver 412, to produce an interleaved sequence 414 (see Fig. 4). It would have been obvious to one of ordinary skill in the art at the time of invention to use only one interleaver, as suggested by Norman, instead of plurality of interleavers (as taught by Walton), to reduce the number of interleavers in the transmitter and therefore reduce the cost and complexity of the transmitter. Nagayasu, Walton, Subramanian, and Norman disclose all the subject matters claimed in claim 1, except that the transmitter transmits a signal obtained by a process of segmenting transmission information into a plurality of frames. El-Gamal, in the same field of endeavor, discloses a wireless communication system (see Fig. 1), wherein the

transmitter in the system comprises a segmentation and framing unit 104, which segments and frames the data into fixed length frames of N bits per frame (see paragraph 0024). El-Gamal further shows a data block reconstruction 134, which reproduces the original transmitted signal. It would have been obvious to one of ordinary skill in the art at the time of invention to modify, Nagayasu, Walton, Subramanian, and Norman, as suggested by El-Gamal to reduce the complexity of encoder and interleaver at the transmitter and also reduce the impact of the data loss during transmission.

As to claim 4, as described above, Subramanian discloses that the constellation encoder 22 is connected to the plurality of scalers 24, each of whose magnitude scales the corresponding carrier by the fraction of the power allocated to it (see paragraphs 0004, 0016, 0019, 0030, and 0043) (i.e. interpreted as power amplifying each encoded signal with a different amplitude). Subramanian further discloses that the rate of amplitude amplification for each frame is changed according to a decoding capability (i.e. the signal to noise ratio).

6. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayasu, Walton, Subramanian, Norman, and El-Gamal, further in view of Laroia et al. (hereafter, referred as Laroia) (US 6,473,418).

As to claims 2 and 3, Nagayasu, Walton, Subramanian, Norman, and El-Gamal disclose all the subject matters claimed in claim 1, except that a different interleaving pattern is used for each user/cell. Laroia, in the same field of endeavor, discloses a communication apparatus comprising a transmitter (see Fig. 6), having an interleaving

unit 601, wherein the interleaving pattern for each user, or for a group of users (interpreted as a cell), may be different (see column 7, last paragraph). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Nagayasu, Walton, Subramanian, Norman, and El-Gamal as suggested by Laroia to reduce the intercell/intracell interference (See the abstract).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayasu, Walton, Subramanian, Norman, and El-Gamal, further in view of Das et al. (hereafter, referred as Das) (US 2003/0076783).

As to claim 5, Nagayasu, Walton, Subramanian, Norman, and El-Gamal disclose all the subject matters claimed in claim 1, except that the transmitting station side is configured to determine the number of codes to be multiplexed according to a decoding capability of the receiving stations side. Das discloses wireless communication system wherein code multiplexing is used within fixed length frames in order to change the number of codes to provide the desired redundancy of successful decoding (See the abstract, paragraphs 0009 and 0021). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Nagayasu, Walton, Subramanian, Norman, and El-Gamal as suggested by Das to increase the performance of the communication system.

8. Claims 10, 17, and 26, are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian and Norman, further in view of El-Gamal.

As to claims 10, 17, and 26, Subramanian discloses a communication system comprising a transmitter 12 having a constellation encoder 22 and a plurality of scalers

24 (See Fig. 1). Subramanian further discloses that the constellation encoder 22 is connected to the plurality of scalers 24, each of whose magnitude scales the corresponding carrier by the fraction of the power allocated to it (see paragraphs 0004, 0016, 0019, and 0030) (i.e. interpreted as power amplifying each encoded signal with a different amplitude). Subramanian further discloses that the rate of amplitude amplification for each frame is changed according to a decoding capability (i.e. the signal to noise ratio). Subramanian, disclose all the limitations claimed in claims 10, 17, and 26, except that the transmitting station side transmits a transmitting signal obtained by a process of segmenting transmission information into a plurality of frames and interleaves all signals with each amplified signal collected into one. Norman, in the same field of endeavor, discloses a radio communication system comprising a first encoder 404, and a second encoder 406, which generate first and second encoded sequences 408 and 410 using different generator polynomials. Norman further discloses that the encoded sequences 408 and 410 are interleaved, by an interleaver 412, to produce an interleaved sequence 414 (see Fig. 4). It would have been obvious to one of ordinary skill in the art at the time of invention to interleave the encoded information before transmission to reduce interference in the system. Also it would have been obvious to one of ordinary skill in the art at the time of invention to use only one interleaver instead of plurality of interleavers, to reduce the cost and complexity of the transmitter. Subramanian and Norman disclose all the subject matters claimed in claims 10, 17, and 26, except that the transmitter transmits a signal obtained by a process of segmenting transmission information into a plurality of frames. El-Gamal, in the same

field of endeavor, discloses a wireless communication system (see Fig. 1), wherein the transmitter in the system comprises a segmentation and framing unit 104, which segments and frames the data into fixed length frames of N bits per frame (see paragraph 0024). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Subramanian and Norman as suggested by El-Gamal to reduce the complexity of encoder and interleaver at the transmitter and also reduce the impact of the data loss during transmission.

9. Claims 24, 25, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagayasu, in view of Walton.

As to claim 24, 25, and 33, Nagayasu discloses a radio communication receiver (see Fig. 1), for reproducing a transmitted signal by a process of de-interleaving the transmitted signal (see Fig. 5, block 52), sequentially decoding the de-interleaved signal (see block 53), and re-encoding the decoded signal (see block 54) to successively cancel the re-encoded signal from the transmitting signal (see subtractor 51). Nagayasu discloses all the subject matters claimed in claims 24, 25, and 33, except that the receiver successively decodes codes of the signal in descending order of Signal-to-Interference and Noise power Ratio. Nagayasu also does not disclose receiving a transmission signal from at least two sending stations each employing a different interleave method and de-interleaving the transmitted signal from the al least two sending stations in correspondence to each different interleave method. Walton, in the same field of endeavor, discloses a wireless communication system (see paragraph 0002). Walton further discloses that at the receiver the signal-to-noise-plus-interference-

ratio (SINR) (see paragraph 0026) values of the incoming signals have been calculated and the SINRs are ranked in order from highest to lowest SINR, and the signal having the highest SINR is selected and further processed to obtain a decoded data stream (see paragraphs 0060 and 0067). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Nagayasu as suggested by Walton to reduce the amount of error in recovery of the transmitted signal (See paragraph 0073). As to the limitations, regarding to the transmitter, Walton discloses that the transmitter is comprising an encoders 212 and interleavers 214 to encode and interleave the incoming data streams and as the result increase the reliability of data transmission (see Fig. 2 and paragraph 0026). Walton further discloses a transmitter includes at least two sending stations (see Fig. 2, antennas 124a-124t) employing a different interleave method (see paragraphs 0039 and 0041, adjusting the interleavers based on CSI as disclosed by Walton has been interpreted as employing different interleave patterns) configured to transmit a transmission signal. Walton also discloses that at the receiver de-interleaver 714, de-interleaves the demodulated data in a complementary manner to that performed by the channel interleaver 214 (see paragraph 0121).

10. Claims 12, 19, and 28, are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian, Norman, and El-Gamal, further in view of Das et al. (hereafter, referred as Das) (US 2003/0076783).

As to claims 12, 19, and 28, Subramanian, Norman, and El-Gamal disclose all the subject matters claimed in claims 10, 17, and 26, except that the transmitting station side is configured to determine the number of coded to be multiplexed according to a

decoding capability of the receiving stations side. Das, discloses wireless communication system wherein code multiplexing is used within fixed length frames in order to change the number of codes to provide the desired redundancy of successful decoding (See the abstract, paragraphs 0009 and 0021). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Subramanian, Norman, and El-Gamal as suggested by Das to increase the performance of the communication system.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure (US 7,260,366).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

L.M.

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER